1. If $g(x) = \dfrac{ax+b}{cx^2+d}$ find $g'(1)$.

A. $(dc-ac-bc)/(c+d)^2$

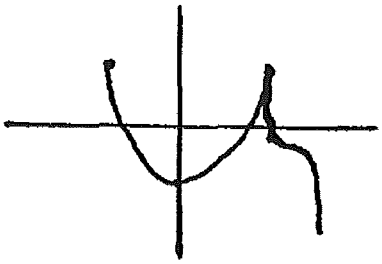
B. $(dc-2bc)/(c+d)^2$

C. $(ac+ad-2bc)/(c+d)^2$

D. $(ad-ac-2bc)/(c+d)^2$

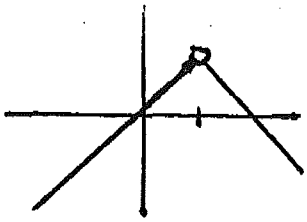
E. $(dc-ac-bc)/(c+d)$

2. If the graph of $f(x)$ is

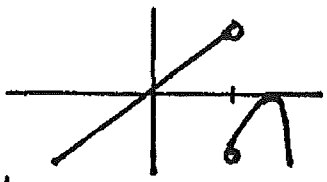


Then the graph of $f'(x)$ looks most like

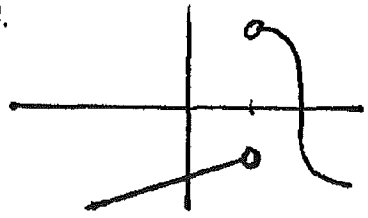
A.



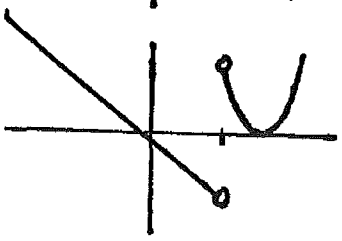
B.



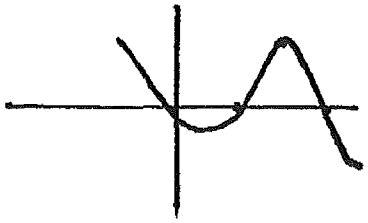
C.



D.



E.



3. If $f(x) = (\tan^2 x - 2)^4$ find $f'(\frac{\pi}{3})$.

A. $32\sqrt{3}$

B. $8\sqrt{3}$

C. 16

D. 32

E. $500\sqrt{3}$

4. A ball is thrown upward from ground level and its height function at time t is

$$h(t) = -16t^2 + 96t.$$

Find the ball's velocity when it hits the ground.

A. 16

B. -16

C. 96

D. -96

E. 0

5. If $f(x) = \sqrt{x + \sqrt{x}}$ find $f'(1)$.

A. $3/2^{5/2}$

B. $3/2$

C. $2^{7/2}$

D. $2^{5/2}$

E. $2^{-3/2}$

6. Find $\lim_{\theta \to 0} \dfrac{\sin\theta}{\theta + \tan\theta}$

A. 0

B. 1

C. 2

D. 1/2

E. DNE

7. The amount of kinetic energy possessed by an object is given by $E = \frac{1}{2}mv^2$ where m is the object's mass and v is it's velocity. Suppose a particle moves according to the position function $p(t) = 2t^3 + 3t^2 - 12t + 7$ for $t \geq 0$. When does the object possess no kinetic energy?

A. $t = 1,\ t = 2$

B. $t = 2$

C. $t = 1$

D. $t = 1/2,\ t = 1$

E. $t = 6$

8. Find dy/dx where $\tan(xy) = e^x + e^y$.

A. $\dfrac{e^x + e^y - y\sec^2(xy)}{x\sec^2(xy)}$

B. $\dfrac{e^x + e^y + \sec^2(xy)}{\sec^2(xy)}$

C. $\dfrac{e^x - \sec^2(xy)}{-e^y + x\sec^2(xy)}$

D. $\dfrac{e^x - y\sec^2(xy)}{-e^y + x\sec^2(xy)}$

E. $\dfrac{(e^x - e^y)(\sec^2(xy) + 1)}{x\sec^2(xy)}$

9. Find equation of the line tangent to f when $x = 1$ where $f(x) = \sin(2\pi x^2)$.

A. $y = x - 1$

B. $y = 4\pi x - 4\pi$

C. $y = 4\pi x - 1$

D. $y = x - 2\pi$

E. $y = 2\pi x - 4\pi$

10. Find dy/dx using logarithmic differentation where $y = (\cos(x))^x$.

A. $(\cos(x))^x(\ln(\sin(x)) - x\tan(x))$

B. $(\cos(x))^x(\ln(\cos(x) - x\tan(x))$

C. $(\cos(x))^x(\ln(\tan) - \sin(x))$

D. $x(\ln(\sin(x)) - \cos(x))$

E. $x(\ln(\sin(x)) - 1)$

11. Find $f'(x)$ where $f(x) = \ln(\ln(\ln(x)))$

A. $\dfrac{1}{(2\ln(\ln(x)))}$

B. $\dfrac{1}{(x\ln(\ln(x)))}$

C. $\dfrac{1}{(x\ln(\ln(\ln(x))))}$

D. $\dfrac{1}{(x\ln(x)\ln(\ln(x)))}$

E. $\dfrac{1}{(x\ln(x))}$

12. Find $f'(x)$ where $f(x) = \dfrac{\sin(x)+\cos(x)}{x+1}$.

A. $\dfrac{(x-2)(\cos(x)-\sin(x))}{(x+1)^2}$

B. $\dfrac{\cos(x)-\sin(x)}{(x+1)^2}$

C. $\dfrac{x\cos(x)-(x+2)\sin(x)}{(x+1)^2}$

D. $\dfrac{(x+1)\cos(x)-\sin(x)}{(x+1)^2}$

E. $\dfrac{2\cos(x)+x\sin(x)}{(x+1)^2}$

13. Find $\dfrac{d^{99}}{dx^{99}}\left[\sin(2x)\right]$ at $x = \dfrac{\pi}{6}$.

A. $-(\frac{1}{2})^{99}$

B. $(-2)^{98}\sqrt{3}$

C. $-(2)^{98}$

D. $2^{99}\sqrt{3}$

E. $(2)^{98}\sqrt{3}$

14. Find $\dfrac{d}{dx}\left[\ln|x^2 - 4x + 1|\right]$ at $x = 1$.

A. -2

B. -1

C. 0

D. 1

E. 2